BEFORE THE BOARD OF OIL, GAS AND MINING
DEPARTMENT OF NATURAL RESOURCES
STATE OF UTAH

LIVING RIVERS, Petitioner, v. UTAH DIVISION OF OIL, GAS AND MINING, Respondent, RED LEAF RESOURCES, INC., Intervenor-Respondent.	**RED LEAF RESOURCES, INC.'S EXPERT WITNESS REPORT, JOHN WALLACE, INTERMOUNTAIN GEOENVIRONMENTAL SERVICES, INC.** Docket No. 2012-17 Cause No. M/047/0103

I. INTRODUCTION AND QUALIFICATIONS

A. I am John Wallace, Principal, Intermountain GeoEnvironmental Services, Inc. "IGES"), located at 4153 South Commerce Drive, Salt Lake City, Utah 84107.

B. Red Leaf Resources, Inc. ("RLR"), has requested me to testify as an expert in these proceedings to defend the Notice of Intention to Commence Large Mining Operations, Red Leaf Resources, Inc. Southwest #1 Project ("NOI"). I have been asked to provide expert testimony in rebuttal to the testimony of Living Rivers' expert witnesses, including but not limited to: (1) Red Leaf's Capsule design and technology; (2) the integrity of the capsule design and layering of Bentonite Amended Soil ("BAS") as a containment system; and (3) RLR's quality assurance and control plan.

C. Summary of Educational and Professional Background:

Education

- January 1974 BSCE- State University of New York at Buffalo
- August 1980 MSCE (Geotechnical Engineering Emphasis), West Virginia University, Morgantown, WV

Professional History

- January 1974 – July 1977 – Staff Engineer, Dames & Moore, Cranford, NJ and Washington, DC
- August 1977 – July 1978 – Graduate Research Assistant, West Virginia University, Morgantown, WV
- July 1978 – April 1979 – Project Engineer, National Soils Services, Inc., Houston, Texas
- April 1979 – April 1981 – Project Engineer, Dames & Moore, Salt Lake City, UT and Washington, DC
- April 1981 – November 1981 – Senior Engineer, Tippett, Abbott, McCarthy & Stratton (TAMS), New York City, New York
- November 1981 – January 1986 – Senior Engineer, Exxon Minerals Company, Houston, Texas
- January 1986 – June 1998 – Senior Consultant and Vice President, Dames & Moore, Salt Lake City, UT
- June 1998 – present – Senior Consultant and President, Intermountain GeoEnvironmental Services, Inc., Salt Lake City, UT

My CV is attached as **Exhibit "A."**

D. My area of responsibility for preparing the NOI and RLR's quality assurance and control plan:

- Using my personnel expertise and the expertise of members of the IGES staff under my direction, I have been responsible for the development, testing and evaluation of the bentonite amended soil (shale) concept proposed for providing environmental containment of both liquids and gases that could potentially evolve during RLR's proposed oil shale processing as discussed in the NOI.

- Additionally, recommendations for strength parameters related to rockfill materials proposed cell construction such as backing walls, ramps or other fills were developed under my direction and review.

- Preliminary cut slope recommendations for pit high walls were developed by me and my staff under my direct supervision and review including output provided in Appendix D.
- A general site development geotechnical report was prepared under my review in 2010 addressing various geotechnical aspects of site development including: earthwork; excavation stability; facility foundation support; pavements and general site conditions.
- Various BAS mixtures, suppliers and bentonite grades have extensively been evaluated under my direction over the course of more than 4 years More than 12 different bentonite products have been evaluated, 150 hydraulic conductivity tests performed with various preparation fluids and at various molding moisture contents and associated index testing performed for additional characterization of the various blends prepared.
- A quality control plan (**"QC Plan"**) was prepared by me to evaluate construction means, methods and performance of test fills proposed as a basis to document actual field performance of the BAS, prior to actual cell construction. As proposed in the QC Plan, successful demonstration of the test fill to meet performance objectives of the BAS will form the basis

for final construction procedures and testing necessary for actual cell development.

E. Responsibility for preparing the QC Plan associated with the Ground Water Discharge Permit Application ("**GWDPA**"): My responsibility in developing the quality control plan for the GWDPA was focused on the QC Plan for BAS placement and compaction.

F. Status of DWQ's review of the QC Plan: It is my understanding that the QC plan proposed, as it relates to the BAS placement using the test fill approach, is currently under review by DWQ.

G. Familiarity with the **EcoShale** Incapsule technology and the Southwest No. 1 Mine ("**Project**"): My familiarity with the **EcoShale** Incapsule technology stems back to initial meetings with RLR in late 2007 and participating in the development of various aspects of the pilot cell concept and design, most notably the BAS encapsulation concept. Use of the BAS concept was predicated on the need for something other than compacted clay soils (since none exit at the site or close to the site) and my more than 25 years of experience evaluating and developing bentonite amended liner applications for sites where a viable clay source was limited or totally absent.

In my early research with hydraulic conductivity of clays and amended soils while at Exxon, work was performed under my direction at the University of Texas working with Dr. David Daniel and Dr. Craig Benson (a graduate student at the

time), two leading researchers in the field of hydraulic conductivity of compacted soil liners. Since that time, a significant portion of my career has focused on the application, testing and evaluation related to the design of bentonite amended soil applications for seepage containment in either liners or cutoff wall systems. My work has included both laboratory and field performance testing of my designs, published papers and being a member of the committee that developed the original ASTM Standard D-5084 for laboratory evaluation of hydraulic conductivity.

II. PURPOSE AND SUMMARY OF TESTIMONY

A. The purpose of my testimony:

1. My testimony and expert report addresses the NOI, particularly as to ground water resources and the adequacy of the NOI to address the requirements of the Utah Mined Land Reclamation Act, § 40-8-1, and implementing regulations.

2. I have been asked to provide expert testimony in rebuttal to the testimony of Living Rivers' expert witnesses, regarding the following allegations:

   a. RLR proposed capsule technology has significant risk of technical and economical failure;

   b. The containment system will not result in zero discharge;

c. Discharge will contain deleterious constituents which will cause water quality violations;

d. High likelihood of project failure and bankruptcy; results in the need for a bond increase.

3. In addition, I have been asked to provide testimony regarding: (1) Red Leaf's Capsule design and technology; (2) the integrity of the capsule design and construction of Bentonite Amended Soil ("**BAS**") as a containment system; and (3) RLR's BAS QC Plan.

4. In addition, I will rebut the allegations of Living Rivers regarding the inadequacies in the NOI and the Project design to prevent ground water contamination.

5. Finally, I will address the QC Plan submitted as to the bentonite amended soil ("**BAS**") layer and the construction of that BAS layer. The BAS will be constructed to achieve a permeability level of 10^{-7} cm/sec.

B. In my expert opinion, the NOI, as approved by the Utah Division of Oil, Gas and Mining, meets the requirements for approval under the Utah Mined Land Program and is appropriately conditioned upon the issuance of ground water quality permits by the Utah Division of Water Quality ("**DWQ**") or upon DWQ's determination that no such permits are required.

III. HISTORY OF IGES' INVOLVEMENT IN THE DEVELOPMENT OF ECO-SHALE INCAPSULE TECHNOLOGY

- Fall 2007 attended an early planning meeting with RLR to discuss early project concepts
- November 2007 IGES performed early site characterization borings near pilot study site
- Spring 2008 early laboratory testing performed by IGES to evaluate compressibility behavior of oil shale and thermal conductivity characteristics
- Spring 2008 testing of Pit Run amended with Pelican Lake Clay and initial bentonite amended Pit Run using WyoBen 200 was performed
- Summer 2008 IGES participated in team to develop pilot cell design
- 2010 additional BAS mix design evaluations initiated and continue into 2011

IV. RLR'S CAPSULE DESIGN AND TECHNOLOGY

RLR's Capsule design employs a thick BAS containment system constructed in layers using a manufactured material. The BAS uses selectively sized, processed barren oil shale, mechanically mixed and moisture conditioned in a controlled manner. The measured portions of the various components (crushed shale, bentonite, and site water) required to create this manufactured material have been extensively tested in the laboratory in the development of the mix design.

Placement, compaction and ultimate performance of the BAS will ultimately be further demonstrated in the construction and testing of test fills prior to actual operational cell construction.

Based on my personnel experience, the application or proposed use of BAS dates back to the early 1980's at landfill, mining and waste remediation projects in New York State, Wisconsin and Utah. The technology is neither novel nor unproven. It is the correct application for the project type and project setting.

V. INTEGRITY OF THE CAPSULE DESIGN AND LAYERING OF BENTONITE AMENDED SOIL AS A CONTAINMENT SYSTEM

The capsule has been designed to incorporate appropriate design standards relative to side slope stability; i.e. high wall stability, and end and side wall design. Slope designs have been developed using conservative material properties and acceptable factors of safety for both static and seismic design considerations. These acceptable levels of stability will assure that he BAS containment structural integrity is maintained through the operational life of the cells and beyond into its reclaimed life.

VI. THE PROJECT DESIGN WILL PREVENT CONTAMINATION OF LOCAL GROUND WATER RESOURCES

A. The low design hydraulic conductivity (10^{-7} cm/sec) of the BAS coupled with its generous 3 ft. thickness will provide a hydraulic seepage barrier that will prevent potential negative impacts to local groundwater resources. The BAS not only provides a very low flow barrier, but also provides the capacity to both absorb and adsorb potential constituents of concern that may attempt to pass through its thick containment.

B. In my opinion, RLR's NOI fulfills all of the requirements of the applicable Division rules and regulations under the Minerals Program. The Division properly conditioned the NOI upon DWQ's further determination regarding the need for an approved GWPDA.

VII. RLR'S QUALITY CONTROL PLAN

A. RLR's pre-production QC Plan specifies testing procedures for design and construction of the EcoShaleTM In-Capsule Process. NOI, Appendix S, § 12, pp. 33-35. The QC Plan includes testing procedures for determining the integrity of the installed Bentonite-Amended Soil ("**BAS**") layer to assure construction of the capsule shell at a hydraulic conductivity of 10^{-7} cm/sec, a commitment of the NOI.

B. QC Plan outlines a procedure that defines how the BAS will be constructed to attain a hydraulic conductivity of 10^{-7} cm/sec.

VIII. CONCLUSION

A. In my opinion, RLR's NOI fulfills all of the requirements of the applicable Division rules and regulations under the Minerals Program. The Division properly conditioned the NOI upon DWQ's further determination regarding the need for an approved GWPDA.

JOHN F. WALLACE, P. E., D. GE.
Professional Engineer No. 157987
State of Utah

CERTIFICATE OF SERVICE

I hereby certify that on May 25, 2012 a true and correct copy of the foregoing **RED LEAF RESOURCES, INC.'S EXPERT WITNESS REPORT, JOHN WALLACE, INTERMOUNTAIN GEOENVIRONMENTAL SERVICES, INC.**, was served by e-mail and U.S. mail, postage prepaid, to the following:

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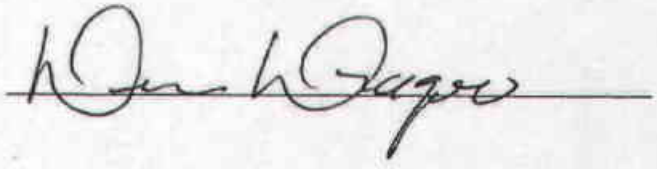

IGES®

JOHN F. WALLACE, P. E., D. GE.

Title	Principal
Expertise	Geoenvironmental Engineering Geotechnical Consulting
Academic Background	B.S., Civil Engineering, S.U.N.Y. at Buffalo, 1974 M.S.C.E., Geotechnical Engineering, West Virginia University, 1980
Registration	Professional Engineer - Utah, California, West Virginia, Nevada, Wyoming, Idaho, New Mexico, Montana, Washington, Colorado, Arizona
Summary	More than thirty years of hands on problem solving and management in grass roots project design, facility development, remedial design and construction and as an expert witness. Significant expertise in earth structures, foundations, solid waste management, groundwater containment and remediation, tailings facility design and reclamation and regulatory negotiations.

Commercial and Industrial Facilities

Consultant, project manager, expert witness and principal investigator for geotechnical investigations both large and small related to major commercial and industrial development, waste management facility siting and design, dams and transportation throughout the Western United States and South America.

- Directed detailed geotechnical/foundation investigations for shallow footing, pile and caisson supported structures at major industrial facilities including Ideal Basic, Martin Marietta, Geneva Steel, FMC, Church & Dwight, UP&L, Deseret G&T, PraxAir, Kennecott, Monsanto Chemical, U. S. West and others.
- Project manager for geotechnical studies to develop site response and design parameters for geoseismic upgrade of Metropolitan Water Authority of Salt Lake City and Sandy's Little Cottonwood Water Treatment Plant facilities. Site specific response spectra were developed for the plant sites.
- Project manager for geotechnical studies to develop site response and design parameters for geoseismic upgrade of Jordan Valley Water Treatment District network of facilities including all well sites, tanks, reservoirs and treatment works. More than 40 separate sites of existing tanks, wellheads, booster pumps and treatment plant locations were evaluated for liquefaction, lateral spread and seismic site response.
- Directed geotechnical investigations for 7 water storage tanks ranging from 1.5 to 4.0 M gallons as part of South Jordan Cities municipal water supply system upgrade. Geoseismic design parameters were developed for a 2 percent in 50 year recurrence interval event associated with the Wasatch fault. Liquefaction and lateral spread were evaluated at each site.
- Project manager and principal engineer for the investigation and development of geotechnical parameters for upgrade of Salt Lake City's water treatment plant in City Creek Canyon. Subsequent focused studies were conducted to evaluate slope stability and foundation anchor design for the facilities backwash tank under design earthquake conditions.

- Direct investigation and development of geotechnical design parameters for major expansion of the Payson Power Plant including construction consultation to control excavation dewatering, reinforced soil mat design to support a 370 ton crane and wick drain installation to manage settlement below cooling tower facilities.
- Directed remedial engineering, design and construction for 8,000 lf. seepage containment collection systems at FMC Corporations Trona Facilities near Little America, WY.
- Principal geotechnical engineer for foundation investigations at 16 proposed compressor station sites along a route extending from Somas, WA to Cortez, CO.
- Evaluated subsidence problems at Deseret G & T's Bonanza Power Plant and developed recommendations for mitigation and stabilization.
- Directed geotechnical investigations for 14 expansion projects at FMC's Green River WY and Pocatello, ID facilities including conveyors, cooling towers, pipeline and power system expansions.
- Principal engineer for facilities expansions at Chevron's North Salt Lake refinery. More than 20 projects completed ranging from pump stations and skid units to a massive HFA control system and 100 ft. diameter tanks with 40 ft. roof heights.
- Directed pile driving analyses and pile load tests for UP&L facility expansion in Salt Lake City, UT.
- Directed remedial engineering and construction for seepage collection systems at D G & T's Bonanza Power Plant.
- Developed foundation recommendations for transformer support and switching station expansion at Bonanza Power Station.
- Directed or conducted more than 20 geotechnical investigations for facility expansions at Geneva Steel's Orem plant including QBOP and the recently completed continuous slab caster installation.
- Geotechnical review consultant on landslide stability analyses related to Weber Canyon pipeline corridor for Pioneer Pipeline.
- Directed investigations for major subdivision developments, retail fast food outlets and low level office facilities.
- Directed geotechnical investigations for three new area hospitals/hospital expansions.
- Performed forensic investigations and developed remedial design recommendations for distressed apartment complex in Salt Lake Valley.
- Performed senior third party review of retaining wall design at Deer Crest Development near Park City, UT. Wall systems included Hilfiker reinforced earth systems, cantilevered walls and tied back soldier pile systems.
- Directed investigations for geotechnical evaluation of the Gateway Project in Salt Lake City, UT for the Boyer Company as a consultant to Dames & Moore.
- Conducted field and laboratory evaluations of clay liner test fill performance for mixed waste and MSW landfill expansions.

Experience with Geosynthetics

- Directed detailed geotechnical investigations and design of a low strength geofabric supported reclamation cover on soft (40 psf shear strength) uranium mill tailings pond.
- Designed geogrid reinforced roadway system to support a 150 ton crane on top of a 225 ft. high tailings dam. Crane support was required to facilitate deep wick drain installation of a metastable embankment constructed of tailings using upstream

methods. A 24 inch thick roadway section was designed using three layers of geogrid reinforcement.

- Designed 50 acre geosynthetic lined waste water evaporation pond system for major industrial facility in western WY.
- Developed initial design and permitting documents for 30 acre landfill in Salt lake County. Initial design incorporated a composite liner system using bentonite amended sand and gravel overlain with a 60 mil HDPE primary liner.
- Developed preliminary designs for rehabilitation of a 100 acre lined multi-pond waste water management system using geomembrane/geocomposite liners at Western Zirconium's Little Mountain Plant.
- Designed geomembrane lined vault system for deactivation of lithium ion batteries at the Utah Testing and Training Range for the USAF.
- Developed innovative design to improve plant railroad performance at Wyoming chemical plant. Previous rail system had caused significant ground deflection and periodic derailments. Remedial design included limited increase of ballast thickness and incorporation of moderate strength geofabric. Rail deflections under full load have been reduced from 4 inches to visually non-detectable.
- Designed and directed test fill construction of geofabric supported test fill at ARCO's Bluewater Mill near Grants, New Mexico. Test fill incorporated varying strength woven fabrics supplied by two manufacturers. Displacement and settlement observations were made for comparison to a test fill segment constructed without the benefit of geofabric.
- Developed final reclamation closure plan for 300 acre ARCO Bluewater Tailings facility incorporating low strength geofabric and wick drains to expedite cover related settlement.
- Developed design to limit displacement settlement on upstream beach for upstream expansion of trona tailings facility in SW, WY. Low strength woven fabric was used to limit displacement to less than six inches for a 10 ft. raise compared to 3 feet of displacement using previous methods without the use of fabric.

Highway Experience

- I-15 Expansion Planning- Consultant to UDOT geotechnical committee for the development of design, investigation and analysis standards for the proposed I-15 expansion.
- I-15 Expansion Investigations-Directed geotechnical investigations for expansion of I-15 along 17 mile Salt Lake City corridor. Investigations included 400 borings and CPTs, associated testing and preliminary foundation analysis, seismicity evaluations and historic pile load test analysis.
- Roadway Upgrade in New Mexico-Directed investigation and pavement design for 25 mile upgrade of U.S. Route 64 in New Mexico.
- Principal investigator for bridge foundations in Richfield, UT. - Directed investigation, performed analyses and prepared recommendations for replacement bridge support across Sevier River east of Richfield, UT.
- Principal engineer for investigation and design of Berthoud Pass expansion. Design included development of retaining wall, slope stabilization and reinforced earth applications along 12 mile segment of Berthoud Pass (US Route 40) in Colorado.

Tieback anchors and soil nail walls

- Principal designer for 24,000 s.f. of permanent and temporary soil nail wall

incorporated into west Mesquite NV, I-80 interchange reconstruction 2011.

- Principal designer for 4,000 s.f. of permanent soil nail for I-80 Weber River bridge replacement reconstruction project near Coalville, UT 2011.
- Developed designs for hillside cut stabilization in the development of the Arbors in Provo, Utah using soil nails and Tecco Mesh facing covering more than 20, 000 s.f of cut slopes ranging up 56 degrees and 40 feet in height.
- Developed permanent soil nail wall designs for 300 lf x 40 maximum near vertical height cut stabilization at Millrock Development in gravel fill soils.
- Developed temporary cut slope stabilization designs using soil nails and biaxial geogrid for near vertical temporary excavation support of 500 ft. long, 20 ft. cut in Dillon, Colorado.
- Developed initial designs for four wall excavation configuration at Roosevelt Gap hotel project near Park City, Utah. 2001
- Developed designs, plans and specifications for 28 individual soil nail walls at proposed Resort Hotel project at Deercrest Development near Park City, UT. Walls totaled more than 35,000 s.f. with the tallest vertical walls exceeding 60 feet in height. First two walls and portions of 16 others were successfully constructed summer/fall 2002.
- Directed geotechnical design development Berthoud Pass expansion Phase 1 including reinforced earth walls, use of geofoam in retaining structures and permanent anchor designs for stabilization of potential slide areas 1997-1999.
- Developed design package for micro-pile excavation support for large commercial development near Conifer, Colorado in addition to V/E soil nail wall option.
- Developed soil nail wall design for excavation support to be integrated into permanent basement wall at University of Arizona medical building expansion 2004.
- Developed design of soil nail wall for permanent excavation support at Best Buy development Murray, Utah 2002.
- Developed tied back sheetpile wall design for 22 feet deep excavation support related to installation of 60 inch storm water sewer line at Salt Lake International Airport.
- Designed excavation support using cantilevered sheetpile at Albion Condominium development in Sandy, Utah.
- Developed designs and oversaw application of soil nail walls used to stabilize abutment cuts required for expansion of the Virgin River bridge near Hurricane, Utah. Work performed for Yenter Construction as part of a design build team. Wall construction successfully completed in summer 2002.
- Reviewed design and distress that developed during installation of soil nail wall at 24 ft. cut adjacent to new Best Buy parking area in Murray, UT. Analysis showed that original wall design was acceptable and that excavation contractor had over-excavated adjacent cut area before soil nail wall was complete, overstressing partially complete wall.
- Developed grouted anchor designs for permanent drilled shaft road embankment stabilization system along 1 mile stretch of SR-191 between near Morenci, AZ.
- Developed plans and specifications for 27 ft. permanent soil nail wall for parking area development at Hillside Project in Jackson, Wyoming.2002
- Prepared design plans and specifications for permanent soil nail wall required to stabilize proposed hillside cut related to realignment and addition of a bike lane along one-mile stretch of Emigration Canyon in Salt Lake City, Utah.2002
- Developed anchored sheetpile designs for expansion of Phillips Petroleum's

Freeport, Texas deep draft terminal facilities 1978.

- Designed and monitored installation of resin grout anchors for slope stabilization of hillside at Sweetwater Lodge, Park City, Utah 1979.
- Designed, monitored installation and tested grouted cable tieback system for two level basement excavation support at IBM building, Salt Lake City, Utah 1980.
- Developed concept designs for grouted cable anchors used to enhance drilled shaft pullout capacity for cooling tower foundations at Nuclear Power Station, Skagit, WA.

Mining, Environmental and Remediation Experience

- Program manager on multiple task ID/IQ contract at Hill Air Force Base. Task Orders included multiple UST investigations and corrective action, feasibility design for air stripper emissions at an Industrial Waste Water Treatment Facility, and various Environmental Assessments.
- Principal engineer for 200 acre expansion design of waste impoundment across soft tailings beach. Designs included the use of geosynthetics, wick drains and effective stress controlled approach to construction.
- Evaluated clay liner performance for both mixed and MSW landfill designs using SDRI in conjunction with laboratory hydraulic conductivity tests.
- Principal investigator and technical consultant for development of a voluntary corrective action strategy to stabilize and reclaim 270 acre abandoned alum waste ponds.
- Principal investigator and technical consultant for closure of API sludge ponds using bentonite amended soil for final cap construction.
- Principal geotechnical engineer for development of bentonite amended shale (BAS) approach for lining and capping "in situ" oil shale production capsule system near Roosevelt, Utah.
- Project director responsible for developing permitting strategy and permit application at a 500 tpd MSW landfill permitted under new Subtitle D regulations using alternative liner design employing bentonite amended soils.
- Evaluated geotechnical properties of gypsum waste pile and performed stability evaluations for eventual expansion to 400 final height.
- Performed evaluation to assess influence of uncalcined gypsum on future pile stability and provided initial consultation for gypsum pile intermediate cover construction.
- Evaluated draft county MSW master planning document and prepared comments for presentation to Council of City Governments in Salt Lake County.
- Directed expansion design development for 500 tpd MSW landfill to comply with draft Subtitle D regulations.
- Directed preliminary design studies for hardrock mine waste dumps. Stable dump to configurations to heights of 150 meters were designed.
- Directed design for a 125 meter high tailings dam in Central Chile.
- Developed highwall reclamation plan and supporting design documentation for closure of Exxon Highland uranium mine in central WY.
- Directed design studies, demonstrations and permitting negotiations resulting in approval to use a 6-inch thick Bentonite/soil liner system instead of the State's proposed 5-feet of clay for a proposed tailings facility in Central Wisconsin.
- Designed and directed construction of reclamation covers at two inoperative Uranium tailings facilities incorporating the use of low strength geofabric to support construction equipment and minimize differential settlements.

- Directed siting and conceptual design studies for new waste disposal facilities at operating and proposed mining operations.
- Developed preliminary design and permitting documents for a MSW landfill in Wisconsin.
- Managed feasibility evaluations for pump and treat system design of high TDS, low pH contaminated ground water associated with copper mine in northern UT.
- Conducted/managed environmental exposure assessments for Kennecott's Utah mining operations including mining, P-plant, concentrator, smelter and waste management sites.
- Conducted tailings and geotechnical/environmental related investigations of Minorco's acquisition of Freeport Gold's central Nevada mining facilities.
- Directed and managed tailings disposal feasibility studies for operations expansion at Atlas Goldbar Mine near Eureka, NV.
- Technical consultant for loss evaluations associated with weather damage at Hycroft Resources heap leach operations near Winnemucca, NV.
- Project manager for environmental impact assessments conducted to satisfy World Bank funding criteria for proposed new tailings and copper dump leach facilities at Southern Peru Copper Corp.'s Toquepala and Caujone Mines (combined throughput 100,000 tpd).

Expert Witness Work

- Expert witness in flooding damage claim related to irrigation pipeline failure at Homestead Resort, Midway, Utah. – Crawford v. Homestead Resort 2012.
- Expert witness in home flooding claim related to adjacent canal, Mapleton, Utah. – Huffaker V. Mapleton Irrigation et al 2011.
- Retained expert witness for evaluation of helical pier supported home settlement after flooding, South Jordan, Utah – Galley v. Wintch Construction and IHP Corp.
- Expert witness for evaluation of settlement of home in Draper subdivision. Hydro-collapsible soils were contributory to time dependent settlements triggered by grading soil loads and irrigation moisture. Claims settled in mediation – 2007 (Gravette v. Formco Foundations)
- Expert witness for evaluation of settlement of four homes in subdivision along Jordan River in West Jordan, UT. Claims settled out of court.
- Expert review of case merits for home settlement and eventual demolition in North Layton Hills subdivision.
- Retained as expert witness for evaluation of settlement related damages to major apartment complex. Claims settled in favor of client/owner in excess of $5M. Deposed and testified at trial. Settled in 2002.
- Retained as consulting expert for distress evaluation of major Hilfiker retaining wall system at $1,000M development near Park City, Utah.
- Retained to provide expert consultation on Amsco windows litigation related to foundation failure during construction.
- Performed forensic evaluation of sliding single family home in Orem, UT. Evaluations included slope stability analyses and determining nature and probable cause of distress.
- Retained as expert to evaluated cause of basement flooding and landscape settlement at residential property in Grantsville, Utah. Settled out of court 2002.
- Retained by Navajo County Attorney to provide expert opinions related to heave

damage at Pioneer Community College, Holbrook, AZ. Claim settled in favor of College.

- Provided expert opinions and testimony related to slope instability, property damage and interrelationship in Kaysville, Utah. Settled out of court.
- Retained as geoenvironmental expert witness for alleged contaminated site litigation in Salt Lake City. Settled out of court.
- Retained as geotechnical expert witness for ski resort/condominium damages related to improper construction. Investigations conducted, deposition given and report prepared. Contractor settled out of court.
- Provided expert opinions and affidavits in support of plaintiff in environmental damage suit against Memoninee Paper Company. Out of court settlement reached.
- Provided expert opinions and served as expert witness for pipeline contractor to evaluate basis for claims addressing changed conditions along 6 mile sewer line corridor. Dewatering difficulty and unstable excavation conditions were evaluated. Two million dollar claim awarded in favor of contractor through mediation.

Career History

6/98 – Present – President and Senior Consultant, Intermountain GeoEnvironmental Services, Inc. (IGES) Salt Lake City, UT
4/93 – 6/98 Vice President and General Manager, Dames & Moore, Inc. – Northern Rocky Mountain Region
1/86 – 4/93 Senior Consultant and Office Manager, Dames & Moore, Inc. – Salt Lake City Operations
11/81 – 1/86 Senior Engineer, Exxon Minerals Company, Houston, TX
4/81-11/81 Project Manager, Tippett, Abbot McCarthy & Stratton, NY, NY
4/79 – 4/81 Project Engineer, Dames & Moore, Salt Lake City, UT & Washington, D.C.
7/78 – 4/79 Staff Engineer, National Soil Services, Houston, TX
8/77 – 7/78 Graduate Research Assistant, West Virginia University, Morgantown, WV
1/74 – 7/77 Staff Engineer, Dames & Moore, Cranford, N.J. & Washington, D.C.

Professional Affiliations

Member, American Society of Civil Engineers
Chairman, Utah Geotechnical Section 2000/2001
Diplomate, Academy of Geo-Professionals – inducted 2011

Publications

Alba, H., Wallace, J., Wells, K., Rosik, E. and Elwell, B. A Comparison of Field and Laboratory Measurements of Hydraulic Conductivity for Compacted Clay Liners – A Case Study, Proceedings of the 35th Symposium on Engineering Geology and Geotechnical Engineering, Pocatello, ID March 2000.

Two Case Histories: Field SDRI and Laboratory Hydraulic Conductivity Comparison Test Programs by John F. Wallace, Sacrison, R.R. and Rosik, E.E., ASTM Specialty Conference on Hydraulic Conductivity, San Antonio, TX Jan 1993.

Wallace, J. and Warren, D., May 1990, "Operational and Financial Implications of Strawman II on Mining", paper presented spring conference of the NW Mining Association, Denver, CO.

Wallace, J., 1989, "Tailings Facility Reclamation Using Geofabrics,"25th Annual Symposium on Engineering Geology and Geotechnical Engineering, Reno, NV.

Wallace, J., 1987, "Laboratory Testing of Bentonite Amended Soil Mixtures Proposed for a Mine Waste Disposal Facility Liner," Geotechnical and Geohydrological Aspects of Waste Management, Lewis Publishers, Inc., Chelsea, MI.

Wallace, J., 1980, The Development and Preliminary Evaluation of a Field Permeability Testing Device for Highway Base and Subbase Course Materials, Thesis, West Virginia University.